

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2005/001229

International filing date (day/month/year)
08.02.2005

Priority date (day/month/year)
05.03.2004

International Patent Classification (IPC) or both national classification and IPC
C09C1/30

Applicant
DEGUSSA AG

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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10/591609

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/EP2005/001229

IP20 Rec'd PCT/PTO 05 SEP 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2005/001229

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	4,6
	No: Claims	1-3,5,7
Inventive step (IS)	Yes: Claims	
	No: Claims	4,6
Industrial applicability (IA)	Yes: Claims	1-6
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

PCT/EP2005/001229

Re Item V**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement****1) Reference is made to the following documents:**

Reference is made to the following document/s/:

- D1: WO 01/14480 A
- D2: US-B1-6 183 867
- D3: US 2004/131527 A1
- D4: EP-A-1 199 336

2) Novelty - Art. 33 (1) and (2) PCT

2.1. WO01/14480 (p. 3 l. 15-28, p. 4 l. 8-9, p. 5 l. 3-5, p. 6 l. 29 - p. 9 l. 23, p. 11 l. 3-18, examples, table 2) relates to modified silica fillers which have been treated with a combination of (a) a functionalising coupling agent and (b) an organometallic hydrophobing compound, applied either together or sequentially, and which are used as a filler in silicone rubber. The average particle diameter of the silica is in the range of 5 to 100 nm, the BET surface area is in the range of 50 to 1000 m²/g. Examples for compound (a) are e.g. divinylpropoxysilane and vinylmethyldimethoxysilane. Examples for compound (b) are e.g. trimethylmethoxysilane and hexamethyldisilazane. In Example 1, the silica filler is reacted with methylvinylchlorosilane and hexamethyldisiloxane. Table 2 discloses the pH value for the treated silicas in the range of 3.75 to 7.88.

WO01/14480 does not disclose the carbon content and the DBP value of the products. However, in view of otherwise identical parameters and treating conditions, it is regarded as unavoidable that carbon content and the DBP value will also fall within the same range. Therefore, novelty cannot be acknowledged for the subject-matter of claim 1.

2.2. US6183867 (c. 3 l. 37-50, c. 4 l. 19-34, c. 5 l. 14-20, example 5, table 1) discloses a surface-modified silica filler for which silica is reacted e.g. with a mixture of bis(vinylmethyl)disilazane, hexamethyldisilazane and hexamethyldisiloxane. The

product is heat-treated at 170 °C, has a particle size in the range from 100 to 1000 nm and a BET surface area in the range from 20 to 400 m²/g. The filler is used as a filler in silicone rubber.

US6183867 does not disclose the pH value, the carbon content and the DBP value of the products. However, in view of otherwise identical parameters and treating conditions, it is regarded as unavoidable that these parameters will also fall within the same range. Therefore, novelty cannot be acknowledged for the subject-matter of claim 1.

- 2.3. US2004/0131527 (P-document, § 19, 22, 39, 41, 50, 54, 55, 61, 62, 70, 71, example 2, 3, table 1) discloses a silica having a BET surface area of 25 to 500 m²/g and an average particle size of 5 to 50 nm which has been silylated with an organosilane such as vinyltrimethoxysilane, hexamethyldisilazane or divinyltetramethyldisilazane. Mixtures of alkoxysilanes and disilazane are preferred. Carbon content is preferably more than 0.1% and less than 1 %. The silylating agent is added in vapour form at a temperature of preferably 20 °C to 120 °C, the temperature being maintained during the reaction time of 1 min to 24 h. The subsequent purification step is carried out at a temperature of preferably 290 °C to 340 °C. Following the purification step, a mechanical compaction e.g. by ball mill is performed.

US2004/0131527 does not disclose the pH value and the DBP value of the products. However, in view of otherwise identical parameters and treating conditions, it is regarded as unavoidable that these parameters will also fall within the same range. Therefore, novelty cannot be acknowledged for the subject-matter of claims 1, 2 4, 6 and 7.

- 2.4. EP1199336 (§ 5, 6) discloses a method for producing functionalised, structurally modified silicas, which comprises spraying the silica first with water and subsequently with a surface-modifying agent, heat-treating and structurally modifying the obtained mixture, and optional post-grinding. The product of EP1199336 does not comprise vinyl groups, but it complies with all of the requirements of claim 1 of the present application with regard to physico-chemical properties. As a "process for producing (...)" is regarded as a "process suitable for producing (...)", novelty cannot be acknowledged for the subject-matter of claims 2, 3 and 5.

3) Inventive Step - Art. 33 (1) and (3) PCT

3.1. The technical problem underlying the present invention can be seen in providing a structurally modified silica which has a lower degree of intergrowth and a lower structure than prior art silicas. This problem is overcome by the present invention by fixing vinyl groups or vinyl silyl groups and additional hydrophobic groups to the silica surface.

Document D1 is considered to represent the closest prior art.

3.2. The process as claimed in claims 4 and 6 differs from claim 3 only in that the surface-modifying agent is used in vapour form. This is regarded as a variation a skilled person would take into consideration, i.e. a variation of process parameters in order to optimise the process, as would lie within the normal practice of a person skilled in the art. No unexpected effects or properties resulting from these variations are indicated in the application. Hence, no inventive step can be acknowledged for the subject-matter of claims 4 and 6.